IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of: Alberte, R. S. et al.	Group Art Unit: 1774
Serial No.: 09/405,269	Examiner: Yamnitzky, M.
Filing Date: September 23, 1999	Attorney Docket No.: CEA-004.01
For: *Safe and Effective Biofilm Inhibitory Compounds and Health-Related Uses Thereof*	

Mail Stop Amendment
Commissioner for Patents
P.O Box 1450
Alexandria, VA 22313-1450

Certificate of First Class Mailing

I hereby certify that this correspondence is being deposited with the U.S. Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O Box 1450, Alexandria, VA 22313-1450, on the date set forth below.

October 3, 2005 — Date of Signature and Mail Deposit

By: _____ John Barretto

Declaration Under 37 C.F.R. § 1.132 by Randall S. Alberte

1. I, Randall S. Alberte, of Estero, Florida, hereby declare as follows:

2. I am a Professor and Director of Biotechnology at Florida Gulf Coast University, Fort Myers, FL, since 2003. Prior to holding this position, I was a Professor of Biology (Adjunct) at the University of California, Los Angeles, from 1992 to 1998. During that time, I was also an Associate Professor (Adjunct) in the Marine Sciences Research Center at SUNY, Stony Brook, from 1990 to 1996. I have obtained my Ph.D. from Duke University in 1974. My Curriculum Vitae including a list of my publications is attached as Exhibit 1.

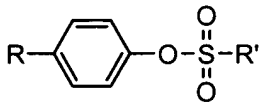
3. I am an inventor in the above-referenced patent application.

4. I have reviewed the present application (herein, the "Specification"), the pending claims, and the non-final Office Action mailed on April 5, 2005 (herein, the "Office Action"). I understand that the Examiner has rejected pending claims 1, 4-6, 9-26, 29, 30, 32, 33, 38, 39, 42-44, 47-63, 66, 68, 70-74, and 89-91 on the grounds that they fail to satisfy the enablement requirement of 35 U.S.C 112, first paragraph, based on the contention that

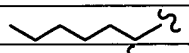
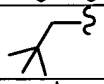
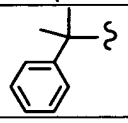
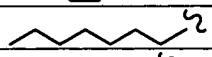
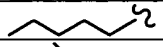
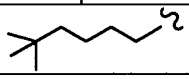
the Specification does not enable a person skilled in the art to which it pertains to make and use the invention commensurate in scope with these claims for a variety of reasons.

5. The compounds disclosed in the specification and the following compounds are encompassed by the present claims (herein, together referred to as the "Fendoff™ Compounds") and are offered to support enablement.

Fendoff™ Compounds



(wherein R' is Cl, F, or OH)

Fendoff Compound	R
Fendoff 10	
Fendoff 20	
Fendoff 30	
Fendoff 40	
Fendoff 50	
Fendoff 60	
Fendoff 70	
Fendoff 80	

The Fendoff™ Compounds are encompassed by Formula 1 of the claims and share the common core of a phenyl sulfate ester structural feature.

In addition to the Examiner's concern over the myriad of compounds is her concern regarding the breadth of such terms as "system," "biofilm resistant surface," "coating," and "anti-fouling." The Examiner contends that the preceding terms encompass many embodiments of the invention unsupported by the Specification. It is the mechanism by which the Fendoff™ Compounds work that justifies the scope of these terms.

6. Exhibit 2 shows the mechanism by which a coating comprising the Fendoff™ Compounds protects a surface. The Fendoff™ Compounds prevent a fouling organism from binding to the surface irregardless of the surface. In particular, the Fendoff™ Compounds themselves bind to the organism thus interfering with the ability of fouling organisms to bind to natural and man-made surfaces. Importantly, this binding to a surface is the first step in the fouling mechanism of many organisms including gram

negative bacteria (e.g., *Pseudomonas*, *Vibrio*, and *Xanthomonas* spp.), gram positive bacteria (e.g., *Staph* and *Strep* spp.), fungi (e.g., yeasts, black slime, ascomycete, ascomycetes, basidomycetes, and phycomycetes), viruses, algal slime (e.g. blue green algae), and protists. Exhibit 3 lists additional fouling organisms that the Fendoff™ Compounds are effective against. Therefore, the Fendoff™ Compounds provide generic fouling control.

7. Fendoff™ Compounds have all been successfully incorporated into a variety of matrices and allowed to leach out of the matrix to determine if they control attachment on the surface. Coating surfaces evaluated include silicones (PDMS, block copolymer silicones, GE RTV-11), epoxy, rosin, acrylate, polyesters, mixtures of epoxy, arylates, polyesters, and rosins, plastics (polyethylene, polycarbonate, polypropylene, latex), glass, and hydroylapatite (tooth enamel). In all cases the Fendoff™ Compounds blocked attachment to and fouling of the surfaces when exposed to single fouling species, mixtures, or natural assemblages from humans or nature. From these coatings good quality paints with anti fouling properties have been produced. This is proof that the nature of the surface is not important and the Fendoff™ compounds are effective in a variety of coatings.

8. Exhibit 4 shows a side by side comparison of the effectiveness of Fendoff™ Compounds at biofilm generation on plaques with rosin coatings exposed to raw running Florida seawater for 110 days. The Fendoff™ Compounds showed excellent anti fouling control. Florida seawater contains the following incomplete list of organisms:

> Slimes- which also include non-living organic matter, silt and detritus;
>
> Bacteria – mostly gram negatives (one of the most common is *Pseudomonas atlantica*) but 10s if not 100s of species;
>
> Fungi – most marine Ascomycetes;
>
> Algae – Benthic diatoms dominated by *Amphora* species, but could include over 100 different species of diatoms;
>
> Other microbes are also in marine biofilms like viruses as these biofilms are hydrophobic and sticky;
>
> Algae – Green macro algae like *Ulva* (formerly called *Enteromorpha*) are very common, but there are probably 20-30 species of greens; Red Macroalgae like *Ceramium* sps., *Gracillaria* spp., *Polysiphonia* spp., and in some case brown macroalgae like *Ecotocarpus* spp., *Pylellia* spp; and
>
> Invertebrates - Barnacles (several species), mussels (several species), spirobid worms, lots of other worn species like tube worms, sometimes oysters.

The following table tabulates the Fendoff™ Compound resistance rating.

Rosin Panel Antifouling Performance*

Fendoff™ Series	ASTM FOUL RESISTANCE RATING				
	30 day	60 day	90 day	120 day	150 day
30	100	92	95	95	95**
30	100	87	91	88	85**
40	100	57	66	54	65**
40	100	63	40	44	40**
60	94	58	80	15	35
60	82	45	15	20	35
50	88	24	15	20	25
50	94	39	15	15	20
10	100	25	15	30	35
10	95	43	20	23	25
Control Coating	42	35	15	25	25**
Control Coating	45	15	25	25	25**
Copper Control	n/a	100	Lost	Lost	Lost
Fiberglass Control	n/a	16	Lost	Lost	Lost

*FRR of 50+ is a passing score.

**Performance unchanged after 180 days.

One can see that the rosin coatings comprising the Fendoff™ Compounds are more effective against fouling over a longer period of time than those that do not contain the Fendoff™ Compounds.

Exhibit 5 also shows the good antifouling properties of the Fendoff™ Compounds in a side by side comparison with controls in other materials.

Exhibit 6 shows the effect of an antifouling paint comprising Fendoff™ Compound 60 against the control paint without the antifouling compound.

Exhibit 7 shows that the Fendoff™ Compounds also have a marked effect on natural surfaces including plant, fruit, and vegetable surfaces.

9. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with knowledge that willful false statements and the like so

made are punishable by fine or imprisonment, or both, under Section 1001 of Title XVIII of the United States Code and that willful false statements may jeopardize the validity of this Application for Patent or any patent issuing thereon.

Randall S. Alberte

Dated: 21 Sep 05

Signature: Randall Alberte

Exhibit 1 - RANDALL S. ALBERTE - *Curriculum Vitae*

20221 Estero Gardens Circle, Estero, FL 33928; Tel 239-992-3057; ralberte@fgcu.edu

Education

Ph.D. 1974 Duke University (Botany/Biochemistry)
B.A. 1969 Gettysburg College (Biology with Honors, minor Chemistry)

Professional Experience

Academic Appointments

Jul 03-current	Professor and Director of Biotechnology, Florida Gulf Coast University, Fort Myers, FL
Jan 92-Dec 98	Professor of Biology (Adjunct), University of California-Los Angeles
Apr 90-Dec 96	Associate Professor (Adjunct), Marine Sciences Research Center, SUNY-Stony Brook
Jun 87-Dec 91	Research Associate Professor (Adjunct), Tiburon Center and Department of Biological Sciences, San Francisco State University
Jan 81-Apr 92	Associate Professor of Molecular Genetics and Cell Biology, University of Chicago
Feb 78-Dec 80	Assistant Professor of Biology, University of Chicago
1979-1986	Resident Associate Faculty of Chemistry, Argonne National Laboratories
Nov 73-Apr 75	Research Associate, Dept. of Biology, University of California-Los Angeles
Sep 74-Jan 78	Acting Assistant Professor of Biology, University of California-Los Angeles
Oct 73-Jan 78	Post-Postdoctoral Research Fellow, University of California-Los Angeles

Business Positions

Jan 05-current	Scientific Advisory Board, NeoGenomics, Inc, Fort Myers, FL
Feb 03-current	Manager, Founder and Chief Scientific Officer, Cerno Biosciences LLC, Boston, MA
Nov 01- Jan 03	Principal, Medical Biotechnology Start-up Development
Sep 00-Oct 01	Vice President and Chief Scientific Officer, PhycoGen Inc., Falmouth, ME
Jun 99-Sep00	Chief Scientist, PhycoGen, Inc., Portland, ME
Mar 99-May 99	Areté Fellow (VP Level) and Head Biotechnology, Areté Associates, Arlington, VA (Top Secret Clearance)
Feb 97-Feb 99	Corporate Sr. Scientist and Head Biotechnology, Areté Associates, Arlington, VA (Top Secret Clearance)

Government Positions

May 96-Feb 97	Project Officer, Biological Science & Technology Program, Office of Naval Research, Department of Navy, Arlington, VA (GS-15, Top Secret Clearance)
May 95-Apr 96	Program Manager, Biological Science & Technology Program, Office of Naval Research, Department of Navy, Arlington, VA (GS-15, Top Secret Clearance)
Oct 91-Apr 94	Scientific Officer, Molecular, Cell & Environmental Biology Program, Office of Naval Research, Naval Research, Department of Navy, Arlington, VA (GS-15, Top Secret Clearance)
Oct 87-Sep 91	Scientific Officer (IPA), Oceanic Biology and Molecular Biology Programs, Office of Naval Research, Department of Navy, Arlington, VA (On leave from U Chicago)

Directorships, Fellowships, Consultancies

Jun 99- current	Scientific Advisor, Stazione Zoologica "Anton Dohrn", Naples, Italy
May 99-Nov 99	Consultant, Arete Associates, Arlington, VA
Sep 94	Director, Molecular Probes for Ocean Science Course, National Institute of Oceanography, Goa, India
Aug 92-Oct 92	Co-Director, "Ecophysiology and Molecular Biology of Seagrasses Course", Stazione Zoologica 'Anton Dohrn', Naples, Italy

Directorships, Fellowships, Consultancies (con't)

Oct 86-Jun 87	Senior Fellow, Center for the Study of Evolution and the Origins of Life, University of California-Los Angeles (sabbatical leave from University of Chicago)
Summers 86-92	Director, Ecophysiology and Molecular Biology of Marine Macrophytes Course, Hopkins Marine Station, and Visiting Professor of Biology, Stanford University
Summers 84-85	Director, Adaptive Physiology of Marine Macrophytes Course, Hopkins Marine Station, and Visiting Assoc. Professor of Biology, Stanford University
Summers 81-84	Instructor and Investigator, Marine Ecology Course, Marine Biological Laboratory
1981-1985	Consultant, Encyclopedia Britannica, Educational Films Division (Film on Photosynthesis - 1st place Cannes Film Festival 1984, Educational Films).
1982-1983	Consultant, NASA, Ocean Observations, Wallops Island Flight Center, MD
1981-1983	Co-Investigator, NSF US-Japan Science Exchange Program, Photosynthesis
Jan 80-Apr 80	Visiting Scholar, Dept. of Oceanography, Univ. of Washington, Seattle, WA
1980-1989	Principal Scientist, Co-operative Research Program - USDA Photosynthesis Improvement Program
Summers 79-80	Co-Director, Experimental Marine Botany Program, Marine Biological Laboratory
May 78-Jun 79	Consultant, United Learning Educational Films, Chicago, IL (production of 3 films on genetics, cell biology and molecular biology for college freshman)
May 76-Jan 77	NIH Postdoctoral Fellow, University of California-Los Angeles
May 75-Apr 76	NSF Energy-related Postdoctoral Fellow, University of California-Los Angeles

Professional Service

2003-current	Editorial Board, *Biofouling*
2002-2003	Advisory Board, CCMP Center, Bigelow Laboratory for Ocean Sciences
1998-2001	Editorial Board, *Journal of Microbiological Methods*
1999-2001	Associate Editor, *Protist*
1996-1999	Editorial Board, *Marine Ecology, SZN*
1991-1997	Editorial Board, *Marine Molecular Biology and Biotechnology*
1994-1997	Organizing Committee Member, 6th International Phycological Congress, Leiden, The Netherlands
1996	By Laws Committee Member, International Society for Bioluminescence & Chemiluminescence
1996	Judge, International High School Science Fair, Tucson, AZ
1996	Judge, National Army/Navy High School Science Fair, San Diego, CA
1994-1996	Member, Ad Hoc Liaison Committee, Phycological Society of America
1991	Instructor, ICGEB Theoretical Course on "Marine Microbiology & Biochemistry," Trieste, Italy
1990--1995	Regional Referee, *Marine Biology*
1989--1992	Editorial Board, *Photosynthesis Research*
1991-1999	Scientific Consultant, Marine Molecular Biology and Biotechnology Programs, Stazione Zoological 'Anton Dohrn', Naples, Italy
1981-1987	Editorial Board, *Plant Physiology*

Honors and Awards

1997	Distinguished Alumni Lecturer - Barnes Lecturer, Gettysburg College, Gettysburg, PA
1995	Certificate of Commendation, Dept. of Navy, Office of the Chief of Naval Research
1994	Certificate of Commendation, Dept. of Navy, Office of the Chief of Naval Research
1993	Certificate of Commendation, Dept. of Navy, Office of the Chief of Naval Research
1992	Certificate of Commendation, Dept. of Navy, Office of the Chief of Naval Research
1991	Superior Achievement Award, Department of Navy, Office of Naval Research
1991	Meritorious Civilian Service Award, Department of Navy, Office of Naval Research
1990	Distinguished Professor of Autotrophy, University of Washington, Seattle, WA (declined)

Honors and Awards (con't)

1990- Elected Fellow, American Association for the Advancement of Science
1990 Certificate of Commendation for Special Achievement, Department of Navy, Office of the Chief of Naval Research
1990 Superior Achievement Award, Department of Navy, Office of Naval Research
1989 Distinguished Lecturer, California State University, Long Beach (1989)
1988 Lawrence Distinguished Scholar, Marine Sciences Research Center, SUNY-Stony Brook, Stony Brook, NY
1986-87 Senior Fellow, Center for the Study of Evolution and the Origins of Life, UCLA
1979-80 Mellon Foundation Fellow, The University of Chicago
1974-75 NSF Energy-Related Fellowship, UCLA
1975-78 NIH Postdoctoral Fellow, UCLA
1969 Beta Beta Beta Award, Outstanding Achievement in Biological Sciences, Gettysburg College
1968 James McClug Award, Outstanding Undergraduate Research, Gettysburg College

Research Grants Awarded

1978-1991 (>$7 million)
NIH, NSF, NASA, NOAA , USDA, DOJ, ONR and CNR (Italy)

2003-current ($2.7 million)
Department of Justice, *Streaming Physical Evidence Collection and Processing*, 10/03-09/06; P.I. R. Alberte, $1.24 M
Cerno Biosciences LLC, *Novel Small Molecule Chemistries*, 05/04-03/06; P.I. R.S. Alberte, $127K
Unimedica, *Pre-med Curriculum Development*, 04/03-03/05; Co P.I. R Alberte, $98K
Department of Defense, Biodefense Technologies, 03/05/-02/06; P.I. R Alberte, $1 M
Environmental Protection Agency, *Early Warning Technologies for Red Tides*; 06/05-05/06 P.I. R Alberte, $250 K

Research Administration (Department of Navy, Office of Naval Research [ONR])

Developed and Managed R&D (6.1-6.4) for ONR, DON and DOD (ca. $10-15 million/yr)
Program Manager, Research Training in Marine Biotechnology and Molecular Biology (1987-1993)
Program Manager, Extreme Environmental Habitats – Archaebacteria Program (1987-90)
Program Manager, Molecular Approaches to Oceanography Program (1989-92)
Program Manager, Biofouling Programs (1987-1996)
Program Manager, Marine Molecular Biology and Biotechnology Programs (1989-1996)
Program Manager, Marine Bioluminescence Program (1990-1996)
Program Manager, Marine Symbiosis Program (1990-1996)
Program Manager, Biocorrosion Program (1993-1996)
Program Co-Manager, Biomolecular Antifouling Program (1991-1996)
Program Co-Manager, Non-polluting Antifouling Coating Fleet Demonstration (1994-1996)
Program Manager, Indo-US Program on Molecular Approaches to Ocean Processes (1992-1996)
Chief Scientist, Submarine Security Programs, Department of Navy (1990-1992)
Program Manager, Non-Acoustic Submarine Technologies Program (1992-1996)
Program Manager, Joint US-Former Soviet Union Bioluminescence Program (1993-1996)
Program Co-Manager Non-Acoustic Submarine Program (1995-1996)
Program Manager, Biological Science & Technology Program, ONR (May 1995-Apr 1996)
Program Co-Manager, DOD Medical Free Electron Laser Program (1996)
Developed Programs in Bioremediation, Environmentally Benign Coating Technologies, Biosensors, Nanofabrication, Nanotechnology, Opto-acoustic Ocean sensors, Biopolymers, and Novel Fuel Cell Technology

Government Service

Level: GS 15 ***Security Clearance - Top Secret***

1995-1996	Panel Member, DOD Biotechnology Advisory Panel
1995--1996	Panel Member, Interagency Metabolic Engineering Group
1995-1996	Panel Member, DOD Biological Warfare Defense Technology Programs
May 95-Apr 96	Program Manager, Biological Science & Technology Program
1994--1996	Biomaterials and Biosensors Advisory Panel, ONR
1993--1996	National Research Council Boards, National Academy of Sciences, Ocean Studies, Marine Biodiversity Panel, ONR representative
1993--1995	Member, Marine Biotechnology Subcommittee of FCCSET Biotechnology Task Force
1993--1995	Member, NSF Antarctic Research Center Committee
Apr 91-May 95	Scientific Officer, Molecular, Cell and Environmental Biology Program
1991-1992	Ocean Studies Board, NRC of NAS, Coastal Ocean Panel, ONR representative
1991	Ocean Studies Board, NRC of NAS, Non-Indigenous Species Panel, ONR representative
1991-1995	Consultant, Autech, Environmental Impacts of Navy Operations
1990--1996	Interagency Committee on Plant Sciences, ONR representative
1990--1994	Ocean Studies Board, National Research Council, Marine Biotechnology Panel, ONR representative
1990--1992	Chief Scientist, Signature Control, Submarine Security Program, Department of Navy
10/89-- 4/91	Scientific Officer, Oceanic Biology and Molecular Biology Programs, Office of Naval Research
10/86--10/89	IPA, Oceanic and Molecular Biology Programs, Office of Naval Research

Committee Memberships (National, International and University)

Florida Gulf Coast University

FGCU-Naples Plant Research Center Planning Committee, Member (July 2004-current)
SUS Presidents Annual Meeting, Biotechnology Panel Leader, Sarasota, FL (June 2004)
Chair, Biotechnology Search Committee (May-July 2004)
Executive Steering Committee for Engineering, Member (April 2004-current)
SUS Homeland Security Program, Panel Member and FGCU Representative (Jan 2004-current)
FGCU Presidents Leadership Team Member (Jan 2004-current)

Other

US-Oman Economic Development Workshop, Panel Member, Oman (Feb 2004)
US Civilian Research Foundation and Development Foundation, Bioterroism Advisory Panel (Sep 2002)
Co-Organizer, Global Climate Change Impacts in the Mediterranean Workshop, Stazione Zoologica, Naples, Italy (Feb 2001-current)
NOAA-National Estuarine Research Reserve System, Review Panel (March 1996)
National Research Council, Ocean Studies Board, Technology Assessment Committee (April 1995)
NOAA-National Estuarine Research Reserve System Review Panel (February 1995)
Ad Hoc Committee on External Liaisons, Phycological Society of America (July 1994-1996)
Organizing Committee, 6th International Phycological Congress, Leiden, (1994-1997)
Bioluminescence Symposium, Organizing Committee Member (1990-1993)
National Research Council, Boards on Biology and Ocean Studies, Marine Biodiversity Committee Member (March 1993-1996)
NSF Initiative in Marine Biodiversity, Committee Member (March 1993)
NOAA-Sea Grant Special Programs, Biofouling and Zebra Mussels, Panelist (May 1991)
National Research Council, Ocean Studies Board, Marine Molecular Biology for the Ocean Sciences Committee (May 1991)
NSF, Science and Engineering Center (SEC), McMurdo Antarctica, Committee Member (1991-1994)

Committee Memberships (con't)

National Research Council, Ocean Studies Board, Member Non-indigenous Species Committee (April 1991)
National Research Council, Ocean Studies Board, Member Molecular Tools for Ocean Processes Committee (1990-1992)
Cody Award Committee Member (National Prize in Oceanography) (1988-1990)
Division of Biological Sciences Tenure Committee, Ad Hoc Member, U. Chicago (1985-1986)
Executive Committee, Woods Hole Science Consortium, Marine Biological Laboratory, Woods Hole, MA (1984-1987)
New York State Regents Doctoral Evaluation Project Committee (1984-1985)
Decennial Review Committee, Marine Biological Laboratory, Woods Hole, MA (1984)
Instructional Committee, Marine Biological Laboratory, Woods Hole, MA (1983-1985)
Plant Cell Biology Search Committee Chairman, University of Chicago (1981-1983)
Graduate Advisory Committee Chairman, Dept. of Biology, University of Chicago (1978-1981)

Professional Society Memberships

American Association for the Advancement of Science, Fellow
American Society of Microbiologist
American Chemical Society

Graduate Student Supervision

Master of Science

Douglas Haberman - Biogenesis of Chloroplast Membranes, Supervisor (U. Chicago, Feb.1982)

Master of Science (con't)

Oscar O. Will - Water Stress Control of Photosynthesis, Supervisor (U. Chicago, Mar 1982)
Robert D. Tuel - Inhibitors of Photosynthetic Electron Transport, Supervisor (U. Chicago, Jun 1985)
Laurie L. Kurth - Amino Acid Metabolism in Cynaobacteria, Supervisor (U. Chicago, May 1986)
Gregory Suba - Photosynthesis in Marine Algal Mats, Co-Supervisor (U. No. Carolina, Sep. 1991).
Jules Milgram - Organization of Photosystem II in the Primitive Green Alga, *Tetraselmis*, sp. Supervisor (U. Chicago, Oct 1993)

Doctor of Philosophy

John M. Clough - Physiological Ecology of Weedy Species, Co-supervisor (U. Chicago, Sep 1978)
Thomas A. Kursar - Structure/Function Relationships of Phycobilisomes, Supervisor (Univ. Chicago, Dec 1981)
Elizabeth Vierling - Biogenesis of Photosystem I, Supervisor (U. Chicago, Aug 1982)
Cynthia A. Walter - Physiological Ecology of Prairie Grasses, Supervisor (U. Chicago, Sep 1983)
Charles Goodnight - Group Selection in Arabidopsis, Co-supervisor (U. Chicago, Aug 1983)
William C. Dennison - Light Control of Seagrass Production, Supervisor (U. Chicago, Sep 1984)
Robert Gulotty - Sub-picosecond Dynamics of Energy Transfer in Light Harvesting Systems, Co-supervisor (U. Chicago, Oct 1984)
William D. Lotshaw - Ultrafast Kinetics of Energy Transfer in Light Harvesting Systems, Supervisor (U. Chicago, Nov 1984)
Alan L. Friedman - Characterization of the Diatom Light Harvesting System, Supervisor (U. Chicago, Jun 1985)
Daniel Eads - Single-step Transfer Times in Photosynthesis, Supervisor (U. Chicago, Oct 1989)
Robert D. Smith - Anoxia Metabolism in Seagrasses, Supervisor (U. Chicago, Nov 1989)
Roberto Ingelesis - Pigment-Proteins and Light Harvesting in Dinoflagellates, Co-Supervisor (UC Santa Barbara, Dec 1993)
Alejandro Cabello-Passini - Light-independent Carbon Metabolism in Marine Algae, Supervisor (SUNY-Stony Brook, Dec 1996)

Doctor of Philosophy (con't)

Gabriele Procaccini - Population Biology and Evolution of Mediterranean Seagrasses, Co-Supervisor (University of Pisa, Italy, Feb 1997)
Yu Gao - Nitrate Metabolism in Marine Diatoms, Co-Supervisor (U. Southern California, Mar 1997)
Deborah Robertson - Biochemical and Molecular Characterization of Glutamine Synthetase in Diatoms, Supervisor (U. Chicago, May 1997)

Post Doctoral Supervision

Dr. A. Michelle Wood (Jul 1980-Nov 1982)
Dr. Lucia Mazzella (Summers 1979, 1980)
Dr. Raymond Barlow (Jun 1983-Sept 1984)
Dr. A. Marshall Pregnall (Jul 1983-Dec 1985)
Dr. David L. Kirchman (Jan 1985-Feb 1986)
Dr. Thomas G. Owens (Aug 1985-Sep 1986)
Dr. Richard C. Zimmerman (Jul 1986-Dec 1987)
Dr. Steven R. Fain (Aug 1988-Jan 1990)
Dr. George P. Kraemer (Dec 1989-Dec 1993)
Dr. James A. Coyer (Feb 1990-Jun 1991)

Research Associates

Dr. Richard C. Zimmerman (Jan 1987–Jul 1997)
Dr. G. Jason Smith (Feb 1991–Jul 1997)
Dr. James A. Coyer (Jul 1991–Apr 1997)

Visiting Professors and Scientists - over 40 between 1978 and 1991

Publications

1970

1. Alberte, R.S. Effect of auxin antagonists on vegetative growth and flowering in Zinnia. *Bios* 70:15-20 (1970).
2. Cavaliere, A.R., and Alberte, R.S. Fungi in animal shell fragments. *J. Elisha Mitchell Soc.* 86:203-206 (1970).

1972

3. Alberte, R.S., Thornber, J.P., and Naylor, A.W. Time of appearance of photosystems I and II in chloroplasts of greening Jack bean leaves. *J. Exp. Bot.* 23:1060-1069 (1972).

1973

4. Alberte, R.S., Thornber, J.P., and Naylor, A.W. Biosynthesis of the photosystem I chlorophyll-protein complex in greening leaves of higher plants. *Proc. Natl. Acad. Sci. USA* 70:134-137 (1973).
5. Fiscus, E.L., Parsons, L.R., and Alberte, R.S. Phyllotaxy and water relations in tobacco. *Planta* 112:285-292 (1973).
6. Alberte, R.S., Thornber, J.P., and Naylor, A.W. Some current views on early chloroplast development: The nature of the lag phase in the greening process. *What's New in Plant Physiology* 5:1-6 (1973).

1974

7. Alberte, R.S., Hesketh, J.D., Hofstra G., Thornber, J.P., Naylor, A.W., Bernard, R.L., Brim, C., Endrizzi, J. and Koehl, R.J. Composition and activity of the photosynthetic apparatus in temperature-sensitive mutants of higher plants. *Proc. Natl. Acad. Sci. USA* 71:2414-2418 (1974).
8. Shiozawa, J.A., Alberte, R.S. and Thornber, J.P. The P700-chlorophyll *a* protein I. Isolation and some characteristics of the complex in higher plants. *Arch Biochem. Biophys.* 165:388-397 (1974).
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Patents and Inventions

Issued Patents

1995

1. Zimmerman, R.C., Alberte, R.S., Todd, J.S. and Crews, P. (US Patent No. 5,384,176) *"Phenolic acid sulfate esters for prevention of marine biofouling".* (Issuing Date: 24 JAN 1995).

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2. Zimmerman, R.C., Alberte, R.S., Todd, J.S. and Crews, P. (US Patent No. 5,607,741) *"Phenolic acid sulfate esters for prevention of marine biofouling".* (Issuing Date: 4 MAR 1997).
3. Alberte, R.S. (US #6,629,696) *"Biosensors".* (Issuing Date: 17 FEB 2004).
4. Alberte, R.S. and Smith, R.D. (US# 6,841,718) "*Transgenic plants incorporating traits of Zostera marina*". (issuing Date 11 JAN 2005).

Pending Patents

1998

1. Zimmerman, R.C. and Alberte, R.S. *"Inhibition of Biofouling by Sulfate Esters".* (US #09/159,814, filed 23 September 1998).

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2. Alberte, R.S. and Zimmerman, R.C. *"Environmentally Benign Crop Protection Agents"* (US #09/405,299, filed 23 September 1999).
3. Alberte, R.S. and Zimmerman, R.C. *"Methods and Compositions for Treating Receptor Mediated Diseases"* (US #09/604,852, filed 23 September 1999).
4. Alberte, R.S. and Zimmerman, R.C. *"Safe and Effective Biofilm Inhibitory Compounds and Health-Related Uses Thereof"* (US #09/405,269, filed 23 September 1999).
5. Alberte, R.S. and Zimmerman, R.C. *"Improved Antifouling Compounds and Uses Thereof"* (US #09/406,184, filed 23 September 1999).

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6. Alberte, R.S., Bright, H.J., Reimers, C. and Tender, L.M. *"Method and apparatus for harvesting power from voltage gradients at sediment-water interfaces"* (US 60/166,995 filed 29 November 2000).

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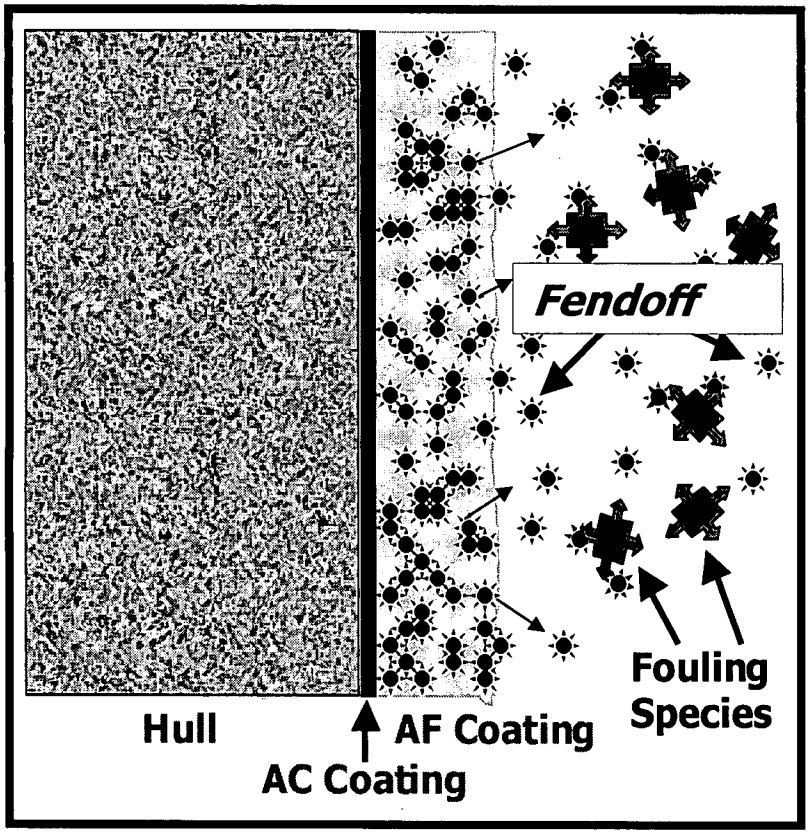
7. Alberte, R.S. and Smith, R.D. *"Generation of Combinatorial Synthetic Libraries and Screening for Novel Proadhesins and Antiadhesins"* (US #09/826,287, filed 3 April 2001).
8. Alberte, R.S. and Smith, R.D. *"Transgenic Plants Incorporating traits for improved production"* (US #09/854,122, filed 10 May 2001).
9. Alberte, R.S. and Smith, R.D. *"Novel Anti-adhesins and Pro-adhesins and Uses Thereof"* (US #02/07426 filed 3 DEC 2001).

Exhibit 2 - **Mode-of-Action**

AF activity of Fendoff™



- *Fendoff™* controls fouling by inhibiting the attachment of fouling species in a non-toxic manner
- *Fendoff™* binds to a broad range of biological "glues" thus interfering with the ability of fouling organisms to bind to natural and man-made surfaces
- *Fendoff™* provides ***generic*** fouling control
- *Fendoff™* can find a range of uses where fouling control is required

Exhibit 3 - **Fouling or Biofilm-forming Species Screened**

Human Pathogens (Bacterial except where noted)

Pseudomonas aeruginosa
E. coli spp. (enteric)
Staphylococcus aureus, S. epidermidis,, S. mutans, S. simulans,
Streptococcus scabiei, S.gordoni, S. oralis, S. sorbrinus, S. pyogenes
Salmonella enteritidis
Fusibacterium nucleatum
Candida albicans (fungus)
Aspergillus sp. (fungus)
Vibrio parahaemylticus
Penicullum digitatum (fungus)

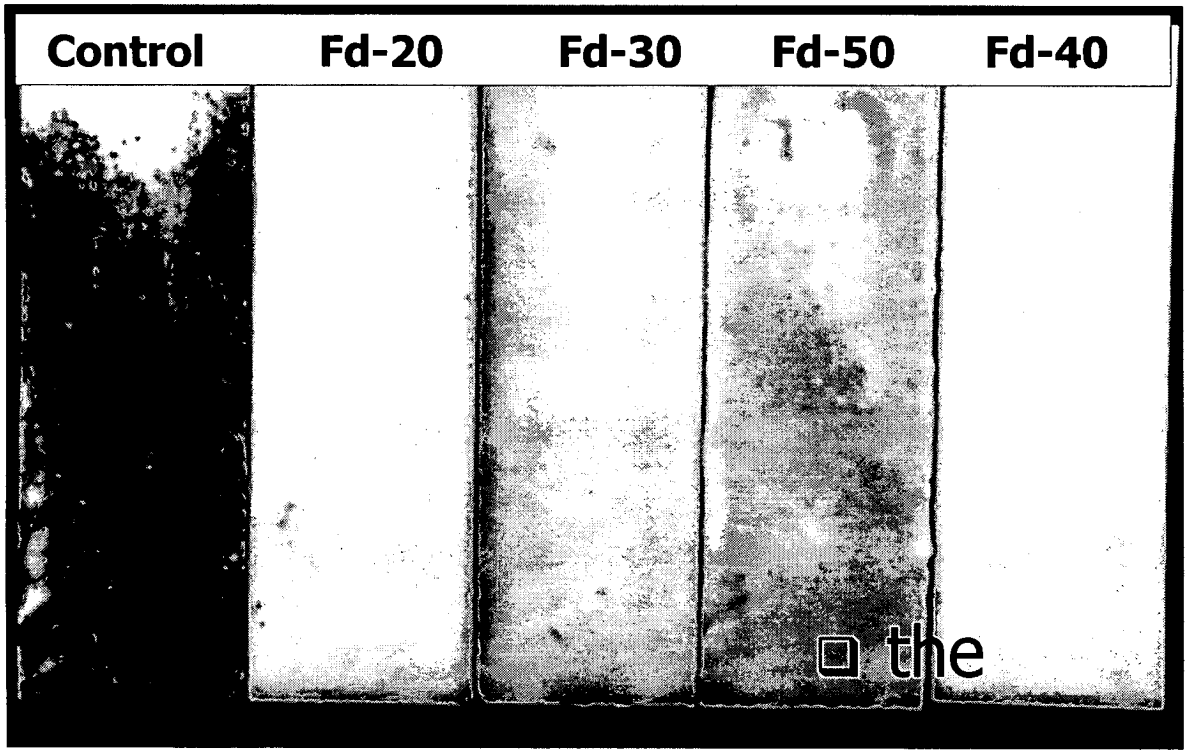
All species listed are blocked from attaching to natural* or manmade surfaces by R'-phenyl-oxy sulfates

Plant Pathogens (fungal except where noted)

Pseudomonas aeruginosa, P. syringae (bacterial)
Xanthomonas sp. (bacterial)
Colletotrichum acutatum, C. fragare
Pythium rostratum, P. irregulare
Magnaphorthe grisea
Phytophthora infestans
Alterneria brassicicola
Colleototrichum acutatum, C. fragarie, C. gleosporioides, C. lindemuthianum
Puccinia graminis, P. ricondia
Venturia inaequalis
Pencillium digitatum, P. sp.
Botrytis cinerea
Ersiphe graminis
Fusarium oxysporum
Pyrenospora sp.

Natural surfaces include host tissues (plant and animal)

Exhibit 4 - **Photographic AF Evidence**



- Biofilm generation on coupons with rosin coating exposed to raw running seawater for 110 days
- Fendoff series show excellent AF control

Exhibit 5 - **Some Examples of Control of Fouling or Biofilm Formation on Manmade Materials with R'-phenyl –oxy sulfates**

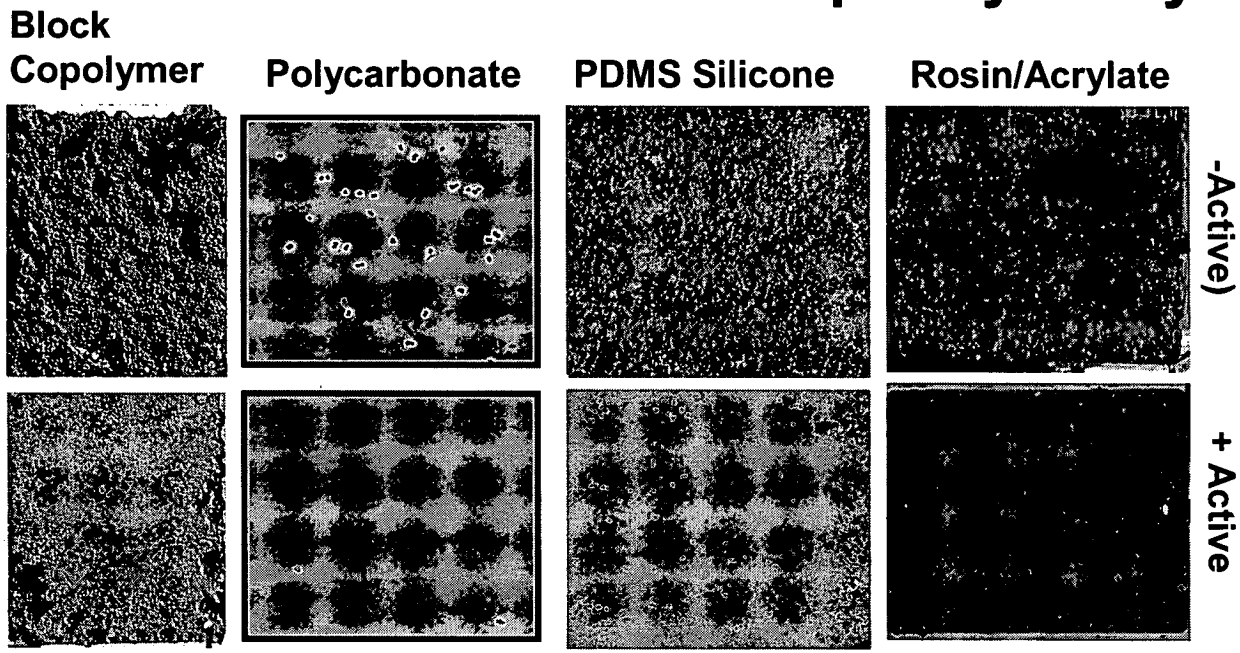
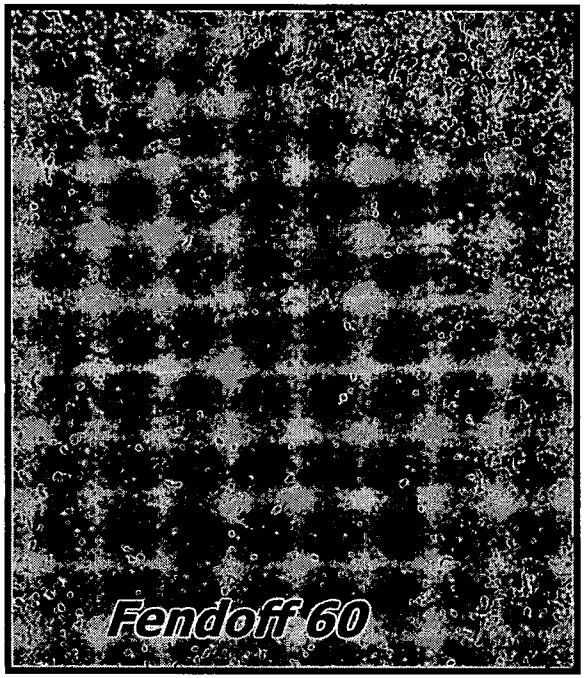


Exhibit 6 - **Fendoff – AF Actives**

Marine Antifouling Agents

- *Fendoff* 60 (t-butylphenyl chlorosulfate) is a broad-spectrum, non-toxic antifouling (AF) agent compatible with commercial AF paints
  - Efficacy established in the field in AF paint coatings against >2,500 fouling species



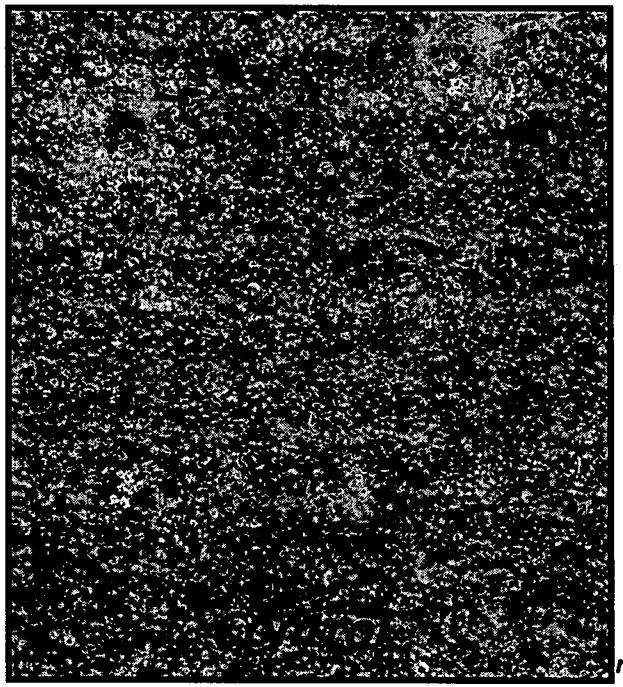


Exhibit 7 - **Some Examples of Control of Plant Infection with R'-phenyl –oxy sulfates**